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Hitchcock's Forge.

In fagoting up large masses of iron for the formation of heavy shafting, there is the same difficulty to contend with that has occasioned the failure of the various attempts at making wrought-iron ordnance of larger than six or eight inches calibre. The metal of the pile or fagot has been burned at the exterior in securing a welding heat at the interior; and, even when the welding of the mass has been accomplished, it may have been injured, and perhaps ruined, by the straining consequent upon first cooling at the surface, while the core was still expanded by the heat. After an expensive shaft has been forged and turned, finished and erected in its place, it is not uncommon to find dangerous flaws on applying the power of the engine, which were not previously apparent, and were undoubtedly occasioned by this cause. Whatever care or skill may be devoted to the forging, this danger of concealed flaws must always be imminent, for the reason that they are the natural results of the method or system followed in the construction. If the shaft could be built up endwise instead of cylindrically, and could be withdrawn from the fire as gradually as it was extended, it is obvious that the evils arising from burning one part to heat another part beyond it, and of straining a completed portion by allowing it to cool prematurely and unevenly, would be entirely avoided.

Very lately an English engineer has stated the losses which the English steamship owners suffer, from the breaking of wrought-iron shafting. He says that the average breaking of heavy crank shafts, water wheel, and propeller shafts, average about forty every year, and that there is an average loss to the owners from such breakages of £10,000 for each ship. He says also, that as a substitute for wrought-iron shafting steel shafting has been tried, but with very unsatisfactory results, and urges some more perfect mode of forging wrought iron, but does not point out any mode for doing it.

This forge, which was originally devised for the construction of large ordnance, fulfills these conditions completely with shafting and other heavy forgings, as well as with guns.

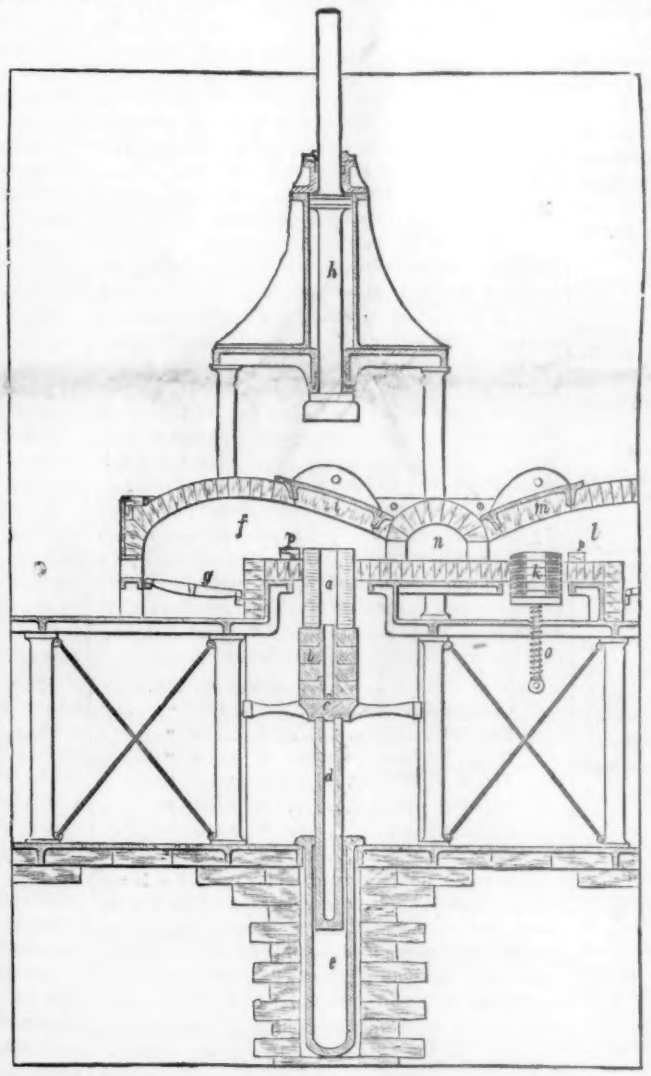
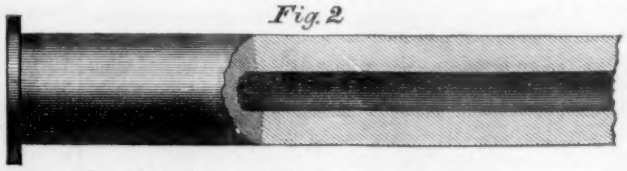


Fig. 2



HITCHCOCK'S FORGE.

The forging is carried on a water anvil, *b*, *c*, *d*, *e*, below the furnace *f*, and projects through the floor of the furnace, in which the upper end of the fagot, *n*, may be brought to a welding heat. The portion of the shaft intended to be added to its length, consisting of a comparatively thin disk, *k*, may be heated in the same or in an adjacent furnace, *l*, having a covered opening, *m*, and when placed upon the end of the shaft, may be struck and welded by a steam hammer, *h*, situated over the furnace, and working through an opening, *i*, in its roof. When the welding is completed, the hammer is withdrawn, the cover, *m*, replaced on the top of the furnace, and the forging lowered with the water-anvil, so that the shaft again only projects through the bottom of the furnace to have its end brought to a welding heat, as before, for the receptian of an additional disk. The entire shaft is thus gradually built up and withdrawn from the action of the fire, without exposing any part of the blast, except where necessary to weld it to the adjacent part forming the complete forging, and then only at a time when it may be necessary to make the weld.

The engraving of the improved furnace has been taken from Mr. Holley's valuable book on "Ordnance and Armor," recently published by D. Van Nostrand of this city, in which work the author speaks most highly of Mr. Hitchcock's process for forging cannon of rings that are added to the forging, and the latter lowered from the fire in the manner above described in connection with shafting until it has attained the length desired. By this system of construction the cannon is composed of circular fibers, disposed in the manner in which the continuous rings have been formed, and the best to resist the explosive strain; and these rings are successively welded, consolidated together, and removed from action of the fire as the cannon is gradually extended to its entire length, without exposing it to the action of the heat except at the points where the welding is to be effected, and when it is necessary to heat the parts in preparation for their junction.

A shaft such as shown in Fig. 2, partly in section, may be as readily forged solid with disks as with rings; but with rings, in this forge, it is possible to make hollow shafts that have been hitherto impracticable. Small hollow shafts for railway axles have been made; but they are restricted to the comparatively small size at which they may be rolled or drawn, and are necessarily very expensive. Large hollow shafts have also been built up of boiler iron; but they have proved a prolific source of trouble on account of the rivets working loose, and have only been used experimentally, and not adopted to any great extent. The reason why hollow shafts are desirable may be simply illustrated. If the diameter of a shaft be doubled, the area of its section, and consequently its weight, will be quadrupled; and as the increased area is at double the distance on an average from the center, it has twice the leverage; and the total strength of the shaft is, therefore, eightfold the strength of the original; or, for four times the weight it is eight times the strength. If now, this shaft of double diameter be hollowed out at the center, until it have only the same strength as the original, it will be only one third the weight. The very great advantages of strength and lightness in hollow shafts may be recognized in any of the departments of nature—in the bones of animals, the quill feathers of birds, the stalks of grasses and canes—and have been adopted by engineers in works of enormous

magnitude, like the tabular bridges in England and over the St. Lawrence river in Canada. The long slender straw supporting a heavy head of wheat, for instance, is nature's model for the immense bridges through which trains rush at express speed. For the practical reasons that have been sufficiently stated, the application of this principle to hollow shafting has been impossible with the ordinary system of forging cylindrical fagots; but by the process of Mr. Hitchcock they may be made of any size, and with the additional advantage that the fibers of which they are composed are arranged in a circular form to resist the tensional strain.

Mr. Hitchcock is now anxious to confer with parties with a view of putting up his forge, and will make the most liberal and satisfactory arrangements. For further particulars address, or call on him at Nos. 4 and 6 Pine street, New York.

White Enameled Cast Iron Ware.

Accounts from the iron works on the Hartz say that the white enamel in cast iron vessels used at that place is prepared from artificial sulphate of baryta, without any addition of tin or lead. This is a great improvement on those valuable utensils for household use; not only because the objection to the poisonous metal lead is removed, but also because the baryta-enamel is far more durable and unchangable. The reason for this is a chemical fact, namely, the sulphate of baryta is a compound of one of the strongest acids, and is not decomposed by other acids. Hence, an enamel prepared from it remains unaffected in contact with vinegar, acidulated fruit, etc., even upon continued boiling; the glossy cover does not become dull and rough, but remains white and perfectly smooth. In this it differs very strongly from a lead enamel. The metallic oxide is not rendered powerless, as the baryta is, but it can freely follow its chemical affinities. Hence the use of a lead compound for such a purpose is reprehensible, the more so as the enamel, when once attacked and laid open, offers still better points for corrosion to a great variety of substances.

Enameled cast iron kettles for the laboratory and the kitchin, in the latter especially, for making preserves, have of late years come into very general use. The objection to them relates to the poisonous nature of the protecting cover, or will be when those of lead or tin enamel at present in the market are suffered to be withdrawn. Let every lady of the house take the precaution, when she buys an enameled kettle, to test the enamel, by means of some acid—the one nearest at hand will answer. Dip a small piece of cotton or linen in a solution of oxalic, tartaric, or any other acid, and place it on the smooth enamel for 24 hours. If, after that, the spot is a little roughened or affected, reject the article. Such kettles, however, will not bear to be handled like one of copper or tin, as the inside is of glass, and once cracked it is unfit for use.

Mineral Specimens for the Paris Exhibition.—Dr. Dupuytren, one of the committee appointed to collect materials to represent California's resources at the Great Exposition, at Paris, in 1867, has collected several thousand specimens of the various ores and metals found on this coast; many of which are of great beauty and value, and will doubtless attract much attention at the exhibition. Among the rarest specimens in the collection, are some which contain metallic gold, silver, copper and mercury, in combinations. There are few minerals known to the arts or sciences but which will be represented in the collection from California. Mr. Eaton, of San Francisco, is making arrangements for sending ten arobas of exceedingly rich gold and silver ores from the Santa Quiteria mines at Valisco, Mexico. Several other parties are preparing to send important collections from other sections of the coast. As the whole will be under the care of Professor Blake, who has been actively engaged in examining the mineral resources of the coast for the past ten years, there is no doubt but these resources will be fairly represented both ocularly and orally.—*Alpine Miner.*

On the Combustion of Gas for Economic Purposes.

A Lecture delivered before the British Association of Gas Managers.

By Dr. Letheby.

(From the London Chemical News, No. 341.)
(Reprinted at Philadelphia in the Journal of the Franklin Institute.)

With regard to the value of other illuminating agents, as the magnesium light, the oxyhydrogen, or Drummond light, and the electric light, little can be said, as they vary so much with the consumption of the material.

In the case of the magnesium light, I find that when a wire the 100th of an inch in diameter is doubled and twisted, it burns at the rate of 2.4 grains per minute, and gives the light of about 69 standard sperm candles. An ounce of the wire, therefore, is equal in light-giving power to rather more than 3¼ lbs. of sperm candles. The power of the Drummond or oxyhydrogen light varies with the combustible used. With

Coal gas and air it is equal to				19	candles.
Coal gas and oxygen	"	"	"	29	"
Alcohol	"	"	"	68	"
Ether	"	"	"	76	"
Hydrogen	"	"	"	153	"

And the power of the electric light varies from 650 candles to 1,444, the average being about 1,000.

All these agents are expensive, and they give a light which is characterized by intensity rather than by quantity; but as the light is pure as well as powerful, it is frequently used for signals and for photographic purposes, and also for theatrical illustrations.

I now pass to a very interesting part of our subject, namely, the cause of the marked differences in the color of the flames of different substances; and in order that you may perceive the reason of this, let me remind you that a pure white light, with all the colors of the spectrum, is never obtained but by the intense ignition of solid or molten matter. This is so with the phosphorous flame, and with the magnesium, the oxyhydrogen, and the electric light. In all these cases there are particles of concrete solid matter in a state of intense ignition, but in the case of coal gas, and in that of burning hydrocarbons, the light is never pure unless it is intensified by very energetic combustion. The reason of this is that the particles are only heated to the point of yellow whiteness; for Dr. Draper has shown that, according to the temperature, an ignited solid (as a spiral of platinum heated by the galvanic current) passes through all the tints of the spectrum from red to white, according to the intensity of the heat, and these tints and temperatures are somewhat as follows:

Very dull red.....	about	970	Fah.
Cherry-red.....	"	1,500	"
Full red.....	"	2,000	"
Dull red, white or orange.	"	3,000	"
Yellow white.....	"	4,000	"
Greenish white	"	5,000	"
Blueish white.....	"	6,000	"
Perfect white.....	"	7,000	"

If, therefore, the temperature of combustion is not sufficiently high, the light is never pure. This is especially so with the creamy lagging flame of underburnt gas, and with the smoky flame of hydro-carbons rich in carbon, as benzole, turpentine and paraffin; but if the combustion of these flames is intensified by a proper supply of air, the temperature of the ignited carbon is increased, and the light becomes purer and purer, so that when it is thrown upon colored objects it displays the tints in a more or less perfect manner. Such a flame, when examined with a prism, gives a spectrum like that of solar light with all the tints of the rainbow. This is the specialty of pure light from an ignited solid. If, however, the vaporous matter does not contain solid particles in a free or concrete form, the ignition of it produces only certain tints of the spectrum, and hence its variable colors. Examined, therefore, with a prism, we see only those bands of color which are characteristic of the flame.

I will show you this by moistening little balls of coke with the chlorides of the following metals, and then introducing them into the colorless flame of a Bunsen burner, or, better still, into that of Griffin's blast jet; and you note how different are the tints, and how they fail to illuminate certain colors of these dipped ribbons:

Chloride of sodium gives a rich yellow flame.
Chloride of copper " " deep blue-green flame.
Chloride of strontium " rich scarlet flame.
Chloride of barium " pale pea-green flame.
Chloride of lithium " " bright crimson flame.
Salt of thallium " " beautiful grass-green flame.

The chlorides are used because they are the most volatile, and they exist in the flame in a vaporous condition. These tints are so characteristic of the several metals, that they afford the most delicate means of discovering their presence; but the great fact which modern investigations have brought out is the circumstance that the spectrum of these flames consists of certain well-defined and constantly placed bands of color. This diagram will show you the spectra of the metals which I have been using; and so true and constant are the positions and tints of these bands, and so delicate are the manifestations of them, that they become the means of discovering the merest traces of the several metals. But I must not pursue this further, except by showing you the differences in the tints of this spectrum and ribbons when examined with the pure white light of burning magnesium.

And now I will briefly describe the contrivances which are used for increasing, or rather, I should say, for fully developing, the temperature of burning gas. I have shown you that the light of a flame depends on the presence of ignited carbon: if, therefore, by any contrivance we can at once burn this carbon, and not permit it to stand, as it were idle, in an ignited condition, the temperature most be considerably increased. This is the principle concerned in all the contrivances for developing the heat of gas.

One of the simplest means of accomplishing this is to mix a sufficient quantity of air with the gas before it reaches the place of combustion, and this is easily done by putting a cap of wire gauze upon the chimney of an Argand burner, and setting fire to the gas above it. The effect of this arrangement is that as the gas passes from the burner to the top of the chimney, it draws in a quantity of atmospheric air, which freely mixes with it and burns the solid particles. The same is the case with the burner of Bunsen, which I have already described; and you will note how strongly it ignites this platinum crucible. The same arrangement is adopted by Mr. Griffin in his reverberatory furnace, which is a Bunsen's burner enclosed in a clay chamber. I have here another contrivance of the same nature called an *atmopyre*, which is used by Professor Hofmann in his furnace for effecting organic analysis. It is a hollow cylinder of baked pipe-clay pierced with a large number of small holes. When it is placed on a small fish-tail burner, the gas, in issuing from the holes, draws in a sufficient quantity of atmospheric air to make it burn at all the apertures with a clear blue light, and thus the temperature is so much increased that the entire body of the numerous cylinders composing the furnace becomes almost white hot.

But we shall find that a still higher temperature is obtained by blowing air into a large volume of flame. This is the plan adopted by Mr. Herapath in the blow-pipe jet. Observe how intensely it ignites a mass of platinum wire; and by putting together a number of these jets, as Mr. Griffin has done in this arrangement, which he calls a blast furnace, you will perceive what a high temperature is obtained; and by surrounding the blast with a case of baked clay, so that the heat may be concentrated, the temperature is sufficiently high to melt all the common metals. As much as a quarter of a hundred weight of cast iron can be melted at a time in one of these furnaces, and three or four lbs. of cast iron or copper can be thus melted in fifteen minutes. Even the very refractory metals, as nickel and cobalt, can be thus fused.

And if, instead of atmospheric air, a jet of oxygen is used, as I will now show you, the temperature is still higher. This is the principle of Deville's furnace, which is a jet of oxygen blowing with a large flame of coal

gas, and directed down upon the refractory substance, the whole apparatus being enclosed in a chamber of non conductors. With this furnace large masses of platinum are easily melted, the platinum being placed upon a hollow bed of lime. I have seen a mass of platinum, weighing about 350 lbs. which had been melted in this manner, and I was informed by Messrs Johnson and Matthey, the platinum assayers of Hatton Garden that the mass required six hours for its fusion. During that time about 360 cubic feet of coal gas, and the like quantity of oxygen were used. In fact, Deville found in his experiments at the *Ecole Normale*, that it required a little more than a cubic foot of gas and a cubic foot of oxygen to melt a pound of platinum. The temperature of the flame must be enormous; calculated from the thermometic powers of gas with air and oxygen, it may be said that it is equal to about 5228° of Fah. when air is used, and 14,320° Fah. with oxygen.

(To be continued.)

Plastic Slate Roofing.

The composition and utility of this new material for roofing, which was noticed at considerable length in our issue of September 22d, is thus referred to by a correspondent writing from New York, under date of October 23d:

EDITORS PRESS: In looking over your valuable paper, of which this company is a subscriber, I see a notice of the new roofing material called "Plastic Slate." Their office joins our own, and I have had many opportunities for ascertaining *facts* concerning this new invention, and can testify that what you say is *all true*, but not *all* the truth. I had the pleasure, a short time since, of being in their rooms at a stockholders' meeting, and listened with interest to the experience of the different licensees, all of whom concurred in the *one* belief, that it is the *best* roofing material known, and has only to be used in a city, town, or neighborhood, and shown, to constitute it the favorite. There has been some delay occasioned by the inability of manufacturers to supply the materials (slate, flour and felt) as fast as called for. This is, however, being remedied very fast; mills are going up in all sections of the country. Speaking of the good qualities, I can speak understandingly. I have seen the roofs, heard parties having them on their houses speak, and as to its being *fire-proof*, I have taken a piece and laid it on a bright fire, in a coal grate, and kept it there until *red hot*, and when taken off and cooled, presented the appearance of a sheet of slate, such as is used in our common schools. There is no question but that it is an entirely wind, water, and fire-proof roof, as well as the cheapest in the world.

Our correspondent has forwarded several samples of this new roofing material, from which a very good idea of the character of the same may be formed. One of the sample has been exposed for eighteen months upon a roof. These specimens may be seen at the office of the MINING AND SCIENTIFIC PRESS, where, also, further information may be obtained relative to the terms on which capitalists may obtain the patent right for this invention on the Pacific coast.—*Min. and Sci. Press.*

GAS PURIFICATION.—Experiments are now being made at the Crystal Palace District, and other gas works, to test the practical value of a recent discovery by Dr. Letheby, who, besides his many other engagements, is consulting engineer to several gas companies. He had found that the waste material of the soda manufacture, and known as "soda waste," is unexpectedly effective in absorbing the sulphur compounds in crude coal gas, and especially the obstinate bisulphide of carbon. The soda waste is employed in the purifiers as layers, as much as oxide of iron is now generally employed to arrest the sulphuretted hydrogen.

—Carbolic acid is coming into general use as a disinfectant. Its action is prompt and persistant. Chloride of lime deodorizes the air, but destroys the noxious matter by chemically changing it, at the same time becoming itself changed and useless for further good. Carbolic acid does not change; while it acts as promptly as the chloride of lime, it continues indefinitely to act.

—The Rochester *Union and Advertiser* gives what purports to be a letter from Oil Rock, West Virginia, describing the search of a subterranean lake of oil to discover the body of Temple, said to have been drowned while attempting to explore the oleaginous cavern. Though unsuccessful, the search resulted in the discovery of another body, not yet identified.

The Process of Roasting Ores.

Translated from the German of F. Plattner, for the MINING & PETROLEUM STANDARD AND AM. GAS-LIGHT JOURNAL, by

J. H. TIEMANN.

[Entered according to an Act of Congress, in the year 1866, by Bryant, Callender & Co., in the Clerks Office of the District Court of the United States, for the Southern District of New-York.]

NUMBER XII.

From the above results we have in answer to the first part of the question, how is it that in different ores having the same amount of silver, the per centage of loss varies, when the ores are subjected to an oxydizing roasting.

1. The loss appears to be principally a chemical one. The mechanical loss in consequence of the fine ore dust being carried off by the draught, which cannot be avoided with finely pulverized substances, cannot be here taken into account, for the mechanical loss of silver is usually proportionate to the loss of ore dust, which is usually recovered in so-called condensing chambers. If it be admitted that particles of silver in any condition, may be carried off by ascending gases and vapors, especially when the roasting is done rapidly, and the oxidation of the sulphur metals is very lively, such a loss would of course be a purely mechanical one. Although it is very improbable that the whole loss of silver in roasting in a large way, is caused by a mechanical volatilization, and the results of the experiments in a small way, where there was no formation of gaseous or vaprous roasting products, or at most but a slight one, as in Nos. 16, 17, 20, 21, 24—27, and 29—34 do not indicate this, it is nevertheless certain, that under certain circumstances, the silver itself possesses the property of becoming volatile.

2. The loss of silver by volatilization appears to take place, either when the silver in the ore passes from its combination with sulphur into the metallic state, or already exists in the ore in that state finely divided, or when undergoing decomposition as a sulphate; the loss is the greatest in loosely aggregated substances, the individual parts of which show little cohesion, and which are not inclined to sinter; because such substances are easily impregnated with air, as is the case with zinc-blende, Nos. 5, 6, 11 and 12, zinc oxyd Nos. 24, 31, and the powdered quartz 25, 29.

Finely divided metallic silver (0.5 grammes) exposed to a red heat in a muffel for one hour, lost but 2.6 per cent., and sulphate of silver which had been previously smelted, lost but 1.6 per cent.; the latter on cooling showed merely traces of metallic silver.

3. The loss of silver increases with the length of time in roasting, when at the same time the temperature is gradually increased—Nos. 3, 6, 9 and 12.

4. The loss of silver increases when opportunity is given for magnetic oxyd of iron, or suboxyd of copper, to decompose the sulphate of silver—Nos. 27 and 28.

5. The loss of silver when exposed for a long time to a red heat, as a sulphate in connection with free oxides or powdered quartz, is greater than when it is present as an antimonate or arsenate, No. 29. The reason of this is, that finely divided sulphate is more easily decomposed at a strong roasting heat, when air is admitted, than either of the other two salts, especially the arsenate, although at a higher temperature the reaction is in so far different, that the antimonate is quickly decomposed, while the other two decompose slowly.

Although these appear to be the principal causes of the loss of silver in an oxidizing roasting of argentiferous ores and mill products, it is nevertheless possible, and indeed very probable, that other circumstances may combine to effect the same result, which can only be discovered by a combination of experimental and practical tests.

b. Experiments on the state in which silver becomes volatile.

In the experiments in answer to the first part of the question, it was found that the loss was greater in loosely aggregated substances, than in those which were more compact, with this fact in view, the experiments in answer to the second part of the question were conducted as follows:

1. Three grammes of finely divided silver were mixed with equal parts (by measure) of powdered quartz, this mixture was placed in a glass combustion tube (2½ inches in diameter and 2 feet long), the part containing the mixture being wound round with platinum foil, the tube in a horizontal position was heated to a gentle red heat, while at the same time dry hydrogen gas from a gasometer was passed over the substance. Although the experiment was continued for a full hour, using about six cubic feet of gas, there were no signs of the volatilization of any silver.

2. An experiment made in the same manner, using carbonic oxyd gas, gave the same results.

3. The same experiment was made, substituting oxygen for the other gases, a dull looking sublimate formed near the substance, towards the open end of the tube, it was grayish white, and gradually increased, covering the tube for several inches; later, that part of the sublimate nearest the substance formed a ring-shaped metallic mirror. At the end of the experiment, which lasted an hour, the sublimate proved to be metallic silver, which was confirmed by testing it in the humid way. That portion of the tube where the substance had lain, under and above as well as to the right and left, was colored dark yellow from the absorbtion of oxyd of silver; and the undermost portion of the quartz which was exposed to the strongest heat, appeared fritted and of a light yellow color.

4. A mixture of finely divided silver and ignited oxyd of zinc, treated in the same way with oxygen, gave in general the same results, except that the metallic mirror was not so perfect.

5. An experiment was made with oxyd of silver, to see if when heated in oxygen, it would be changed to metallic silver as quickly as it is in atmospheric air. For this purpose about four grammes of perfectly dry oxyd of silver were put into a glass tube, which, as before, was covered with platinum foil, and after oxygen had been passed through the tube for a long time, the oxyd of silver was heated to a glow. It was soon evident that oxyd of silver deports itself the same in oxygen as in atmospheric air, being quickly reduced to metallic silver at an increased temperature. Oxygen being still allowed to pass over the now porous and slightly glowing mass, a sublimate of silver was formed, as in the previous experiments, though not so marked, and the tube after the experiment, was colored yellow where the substance had lain. As the last three experiments have shown that the silver becomes volatile as an oxyd, when it has an opportunity to become oxidized at a higher temperature, and that the volatized oxyd gives off its oxygen again there were the temperature is lower than where it was formed, we may draw the following conclusions, that that portion of silver which escapes, in addition to the ordinary furnace dust in an oxidizing roasting, does not escape as metallic silver, but, from a certain temperature, beginning at a low red heat, passes off as an oxyd, which in a free state, at a lower temperature gives off its oxygen again, and is reduced to metallic silver; this latter being in an infinitely finely divided state, is carried off by the gases and vapors from the products of the roasting, the gaseous products of combustion, and the partly decomposed air, and after leaving the furnace, if not allowed opportuuity to settle, is carried into the atmosphere.

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—An ingenious mode of getting a correct representation of an actual battle, landscape, etc., in a panoramic form, has been suggested in Paris. The main feature in the arrangement is a revolving cylinder, with a vertical slit in it, through which the images, etc., enter, and are thrown on a photographic medium properly sensitized.

—A burglar-proof safe lock has been invented by a man in Rochester, N Y., which is claimed to be superior to all others. Its peculiarity consists in a magnet, which retains the catch in such a position, that not even the slightest movement can indicate the position of the tumbler, to one who is attempting to pick the lock.

To Whom the Origination of the Venango Petroleum Discovery is Due.

[*Continued.*]

PROPERTIES OF DISTILLED OILS.

Exposed to the severest cold of the past winter, all the oils obtained in this distillation remained fluid. Only the last two or three appeared at all stiffened by a cold of 15° below zero, while the first three or four products of distillation retained a perfect degree of fluidity. Exposed to air, as I have said, they suffer no change. The chemical examination of these oils showed that they were all exposed to hydrogen and carbon, and probably have these elements in the same numerical relation. When first distilled they all had an acid reaction, due to the presence of a small quantity of sulphuric acid, derived from the crude oil. This was entirely removed by a weak alkaline water, and even by boiling in pure water. Clean copper remoined untarnished by the oil which had thus been prepared, showing its fitness for lubrication, so far as corrosive quality is concerned. The oils contain no oxygen, as is clearly shown by the fact that clean potassium remains bright in them. Strong sulphuric acid decomposes and destroys the oil entirely. Nitric acid changes it to a yeliow, oily fluid, similar to the changes produced by nitric acid on other oils. Hydrochloric acetic acids do not effect it. Litharge and other metallic oxides do not change it, or convert it in any degree to a drying oil. Potassium remains in it, unaffected even at a high temperature. Hydrates of potash, soda and lime, are also without action upon it. Chloride of calcium and many other salts manifest an equal indifference to it. Distilled with bleaching powders (chloride of lime) and water in the manner of producing chloroform, the oil is changed into a product having an odor and taste resembling chlorform. Exposed for many days in an open vessel, at a regulated heat that below 212°, the oil gradually rises in vapor, as may be seen by its staining the paper used to cover the vessel from dust, and also by its sensible diminntion. Six or eight fluid ounces, exposed in this manner, in a metallic vessel for six weeks or more, the heat never exceeding 200°, gradually and slowly diminished, grew yellow, and finally left a small residue of dark brown lustrous-looking resin, or pitchy substance, which in the cold was hard and brittle. The samples of oil employed were very nearly colorless. This is remarkable when we remember that the temperature of the distillation was over 500° Fah. The oil is nearly insoluble in pure alcohol, not more than 4 or 5 per centum being dissolved by this agent. In ether, the oil dissolves completely, and on gentle heating is left unchanged by the evaporization of the ether. India rubber is dissolved by the distilled oil to a pasty mass, forming a thick black fluid, which, after a short time, deposits the India rubber. It also dissolves a little amber, but only sufficient to color the oil red. It also dissolved a small portion of copal in its natural state; but after roasting the copal dissolves as it does in other oils.

USE FOR GAS MAKING.

The crude oil was tried as a means of illumination. For this purpose a weighed quantity was decomposed, by passing it through a wrought iron retort filled with carbon and ignited to full redness. The products of this decomposition were received in a suitable apparatus. It produced nearly pure carburetted hydrogen gas the most highly illuminating of all the carbon gases. In fact, the oil may be regarded as chemically identical with illuminating gas in a liquid form. The gas produced equalled ten cubic feet to the pound of oil. It burned with an intense flame, smoking in the ordinary gas jet, but furnishing the most perfect flame with the Argand burner.

These experiments were not prosecuted further, because it was assumed that other products, now known and in use for gas making, might be employed, at less expense for this purpose than your oil. Nevertheless, this branch of inquiry may be worthy of further attention.

DISTILLATION AT A HIGHER TEMPERATURE.

The results of a distillation at a regulated temperature in glass, led us to believe that in a metallic vessel capable of enduring a high degree of heat, we might obtain a much larger proportion of valuable products. A copper still, holding five or six gallons, was therefore provided, and furnished with an opening, through which a thermometer could be introduced into the interior of the vessel. Fourteen imperial quarts, (or, by weight, 560 ounces) of the crude product were placed in this vessel and the heat raised rapidly to 280° C., (=536° Fah.), somewhat higher than the last temperature reached in the first distillation. At this high temperature the distillation was somewhat rapid, and the product was easily condensed without a worm. The product of the first stage was 130 ounces (or over 28 per cent) of a very light-colored thin oil, having a density of .792. This product was also acid, and as before, the acid easily removed by boiling with fresh water. The temperature was now raised to somewhat above 300°C., (=575° Fah.), and 123 ounces more distilled, of a more viscid and yellowish oil, having a density of .865. This accounts for over 43 per cent. of the whole quantity taken. The temperature being raised now above the boiling point of mercury, was continued at that until 170 ounces, or over 31 per cent., of a dark brown oil had been distilled, having a strong empyreumatic odor. Upon standing still for some time, a dark blackish sediment was seen to settle from this portion, and on boiling it with water, the unpleasant odor was in a great degree removed, and the fluid became more light colored and perfectly bright. [It was on a sample of this that the photometric experiments were made.] The next portion, distiled at about 700° Fah., gave but about 17 ounces, and this product was lighter in color and more fluid than the last. It now becomes necessary to employ dry hickory wood as fuel, to obtain flame and sufficient heat to drive over any further portions of the residue remaining in the alembic.

It will be seen that we have already accounted for over 75 per cent of the whole quantity taken. There was a loss on the whole process of about ten per cent. made up, in part, of a coaly residue that remained in the alembic, and partly of the unavoidable loss resulting from the necessity of removing the oil twice from the alembic during the process of distillation, in order to change the arrangements of the thermometer, and provide means of measuring a heat higher than that originally contemplated.

About 15 per cent. of a very thick, dark oil, completed this experiment. This last product which came off slowly, at about 750° Fah., is thicker and darker than the original oil, and when cold, is filled with a dense mass of pearly crystals. These are paraffine, a peculiar product of the destructive distillation of many bodies in the organic kingdom. This substance may be separated and obtained as a white body, resembling fine spermaceti, and from it beautiful candles have been made. The oil in which the crystals float is of a very dark color, and by reflected light is blackish green, like the original crude product. Although it distills at so high a temperature, it boils at a point not very different from the denser product of the first distillation. The paraffine, with which this portion of the oil abounds, does not exist ready formed in the original crude product, but it is a result of the high temperature employed in the process of distillation by which the elements are newly arranged.

(To be continued.)

How to Warm Houses

Is a subject of much importance to all who dwell in houses and have an eye to economy and comfort.

Since the introduction of coal, a vast amount of ingenuity has been expended in improving and perfecting the construction of coal stoves and heaters, etc., and great improvements have been made of late years in all such appliances. Some of the best base burners and gas consumers, so called, have been highly extolled and seem to be nearly all that is desired, yet, most of them have some objections in their use.

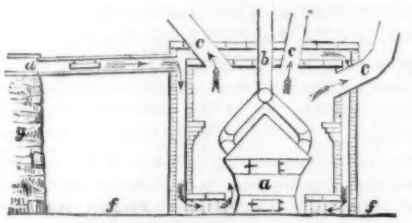
The air from the room to be heated must supply the combustion in the stove or grate, which rapidly passes up the pipe or chimney, while cold air enters from the outside at the windows and every crevice, to supply the vacuum, giving a very unequal temperature to the room.

It was this which caused the old-fashioned deacon to suppose the new stove in church drove the cold against those who sat near the wall. It was more correctly the cold air from the outside that drove the warm air up the chimney.

The dust and dirt which stoves occasion, and the labor required to keep a number going at once when several apartments are to be heated, are objections apparent to all who use them. The HOT AIR FURNACE obviates most of these objections.

A single fire is employed for warming several rooms at the same time. It effects a perfect ventilation without the introduction of cold currents. Pure fresh air comes in from the outside passing around the furnace, and flowing upward in a warm state, without any abatement of its purity. It thus drives out gradually the existing air from the room through the different crevices, thus exactly reversing the process caused by stoves and fire places. Wherever a good furnace is used there is a mildness and softness felt throughout the house, which stoves can never impart.

In order that such of our readers as may desire to erect furnaces, or to know how to manage them, may understand their mode of operation, we give this sketch of one of the best, for burning coal now in use:—



THE GOTHIC FURNACE

a, fire-pot; b, smoke pipe; c c c, hot air pipes; d, cold air box; f f, cellar floor; g, cellar walls.

It is enclosed in a brick air chamber, made with double walls, and from it hot air pipes, c c c pass to the different rooms above. A space four or five inches wide between the double walls, admits the cold air to the lower part of the furnace.

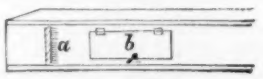
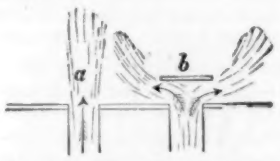


Figure 2.

represents a portion of the cold air box, with a sliding board, a, to cut of the admission of air from the outside in time of high wind, or to prevent the hot air from being driven outward through it, when strong winds prevail on the opposite side. When thus closed, the door, b, should be opened for the entrance of air from the furnace room or basement. The cold air box should always be placed on the side toward prevailing winds, and when these winds are strong the sliding board, a, should be partly closed.



The hot air which commonly enters from a furnace, rises perpendicularly upward as shown in the cut at a, and heats the room gradually from the upper to the lower part: a different result is produced when a plate of tin or sheet iron, b, is placed a short distance above the register, throwing the hot air out more horizontally, as shown by the arrows.

Ornamental caps are constructed for standing over registers for this purpose, but the same result may be attained by using a sheet of iron or tin plate, furnished with wires at the corners for supporting it, eight or ten inches from the floor.

The following is an extract from a lengthy article

on this subject, in the *Cultivator*, written by M. J. Thomas, a very practical man, who has given great attention to the subject of economy in fuel and the means of warming dwellings:

"During the past twenty-five years we have tried a number of Hot Air Furnaces of different forms, and have found *none equal to Lesley's Gothic Furnace.* The principal heating part is made of cast iron; several pieces setting one upon another, and fitting together in troughs, filled afterwards with loose sand, so that there is not the slightest leakage of gas or smoke. The softness and purity of the air thus furnished, has been particularly observed by visitors. The fire is perfectly controlled without dampers, by means of simple registers which are easily managed. In addition to these advantages the large heating surfaces contribute greatly to economy in fuel; six or seven tons of coal being sufficient to warm half a dozen rooms for the six months including winter, in the northern States. Mr. Lesley's store is at No. 605 Sixth avenue, New York.

On the Future Water Supply of London.

[From the London Journal of Gas Lighting and Water Supply.]

BY GEORGE WILLOUGHBY HEMANS, C. E., AND RICHARD HASSARD, C. E.

The ideas on which the following project is based have been for a long time under consideration, and the descriptive particulars were actually preparing for circulation, when the public were presented with the views on this subject of a very eminent gentleman, Mr. Bateman, C. E., in the form of a pamphlet, ably written and extensively circulated, and which has already attracted a large amount of remark and approval.

It is felt, therefore, that these suggestions appear now somewhat at a disadvantage, particularly as the sources of water supply recommended would seem, at first sight, to demand works in length and extent of greater and more startling magnitude than even the already sufficiently bold project of Mr. Bateman, for bringing water to London from the Welsh hills at a distance of 183 miles. The sources herein recommended lie at a distance of 240 miles from London, but notwithstanding this increase of distance, we believe that when the subject is fully investigated, it will appear that our project—although involving an apparently larger outlay in the first instance—will, from the absolute certainty of the rainfall, the extraordinary purity of the water, the facilities afforded by the existing lakes for the construction of immense reservoirs, and from the revenue which may fairly be expected from the sale of water in the districts traversed by the aqueduct, be found the best and cheapest which has yet been proposed, and that ultimate economy will arise from its selection.

The future water supply of London, from its magnitude and importance, from the sanitary considerations involved in its successful elucidation, and having in view the enormous and rapidly increasing population which will afterwards be depended upon it for one of the chief necessaries of life, is a question without parallel in the history of engineering in ancient or modern times.

Of the existing water supply little need be said; that it is imperfect and unsatisfactory, both on account of the quality of water, the intermittant nature of the supply, and rate of charge, is admitted on all hands; whilst, from the peculiar circumstances of the case, it is scarcely possible for the water companies to afford a supply much larger in quantity, or better in quality, than at present furnished: they have done their best to carry out the obligations imposed on them by the acts of 1852, and have expended large sums in their attempts to do so; the limit they can attain has, however, been nearly reached, and if the metropolis is to have a supply of pure water, such as is now enjoyed by many of the provincial cities and large manufacturing towns in the kingdom, it is full time that measures should be taken to investigate the question, and secure a suitable district from which to obtain it, their being very few available localities now unappropriated, or which will not, owing to the growing necessities of this populous country, shortly be appropriated, for the supply of other towns and districts.

The population of London and its suburbs has increased of late years in such an extraordinary ratio—with the probability of at least this rate of increase being maintained—as to render it absolutely essential that any scheme now put forward should be designed so as to admit of a quantity of water, at least double the existing consumption, being brought to the metropolis, from time to time, as the requirements of the district demand additional supplies.

The population of the metropolis and suburbs may be taken at 3,000,000, and the quantity of water now actually supplied by the different companies at nearly 100,000,000 gallons daily.

Of this a very large proportion (about one half) is extracted from the Thames above tidal influence as required by the acts of 1852, and such a serious diminution of the volume of water in the river flowing onward to London, has of late attracted great public notice, to which it is not necessary at present further to advert.

* * * * * *

The attributes of the future supply must be quantity, purity and softness, with distribution at high pressure, on the constant system.

It would not be prudent, therefore, to provide for an eventual supply of less than 250,000,000 gallons daily—that is, 200,000,000 gallons for the metropolitan districts proper, and 50,000,000* gallons for sale to districts traversed by the aqueduct *in transitu* into London.

Experience has hitherto shown that the largest water works are in the end the cheapest; and those which furnish the largest quantity, and combine a supply for trading and manufacturing purposes with that for domestic and private consumption, invariably supply water at the lowest rate to the ordinary consumer—that is, to the public at large.

This project is therefore put forward for the supply, not only of London, but, where necessary, of the vast population lying between the districts from which it is proposed to obtain the water, and the metropolis itself and in these intermediate districts like the populous and thriving towns of Lancashire, of the Potteries, and of the Midland Counties.

By such an arrangement, it is obvious that the cost to all parties will be materially lessened.

To obtain this necessarily great quantity of water of requisite purity and softness, we must seek a district of considerable area, free from peat and contamination of every kind, where the rain-fall is large, and ascertained beyond doubt by a long series of observations, and where facilities exist for storing up the surplus waters of wet seasons, at such altitudes as to permit of the supply being drawn off and conveyed to London by gravitation, and of being delivered there at about 220 feet above high water; using in all cases where practicable the existing covered service-reservoirs, and, failing these, covered service-reservoirs to be constructed in such localities as may be found on investigation most advantageous for utilizing the present pipes and works of distribution.

This altitude of about 220 feet for distribution would be most convenient and suitable for the entire of the metropolitan districts, would ensure an ample pressure for ordinary domestic supply and in case of fire, and would avoid the abandonment and destruction of the existing appliances of distribution, which would be entailed by the use of a much higher pressure, and by the adoption of a different system of service; in fact, the metropolis is so large as to preclude its being dealt with otherwise than in districts, excepting by the abandonment of a great portion of the present works and pipes, involving an obnoxious and undesirable expenditure.

There are, it is true, some elevated suburban districts for the service of which it would still be necessary to raise water by pumping; but these could not, under any circumstances, be included in a project for the supply of the metropolitan districts by gravitation, and their area is comparatively so small that it is scarcely necessary to notice them in the consideration of this important subject.

*A small addition to the size and cost of the aqueduct would enable the provincial supply to be increased at any future time to 100,000,000 gallons daily.

Those well known mountain ranges of the counties of Westmoreland and Cumberland draining into the rivers Lowther, Eamont, and Greta, and adjoining the lakes of Haweswater, Ullswater, and Thirlmere, possess all the attributes of a locality from which an enormous amount of the purest possible water may be obtained; and the existing lakes can easily and at small expense, be adapted to form immense reservoirs for its conservancy and storage, at convenient altitudes for the water to be drawn off and conveyed by gravitation to London

By this process of conservancy the expense and inconvenience of constructing such a number of wholly artificial reservoirs, as would otherwise be necessary for the storage of the immense requisite quantity of water, will be obviated.

The area from which water is herein proposed to be collected, extends over 177 square miles, the altitudes varying from 500 to 3,200 feet above the sea. These, however, are the extremes; the mean altitude will probably be 1,300 or 1,400 feet above sea level.

The entire district is bare hill pasture and rock of the primitive formations, and excepting a small area in the vicinity of Ullswater, which can easily be excluded from the scheme, is free from mineral workings or other sources of contamination, and the waters are of remarkable purity and softness. * * *

In estimating for the supply of London and the intermediate towns, the water-producing capabilities of the district, we take it, to avoid question, at somewhat less than its minimum—viz., at 90 inches.

(To be continued.)

Mining Share Market.

The San Francisco Weekly Stock Circular of January 26th gives the market rates of mining stock as follows:

The stampede in mining stocks this week has created a marked sensation in all circles. It is often very difficult to account for the caprices of the Mining Share Market, but during the past few days the decline has been of so serious a nature that there would seem to be some interpretation of the causes which have led to it. So far we can learn (and we have taken some pains to obtain reliable information), with, perhaps, one or two exceptions, leading mines show as much intrinsic wealth at present depths, and give as much promise for the future, as at any time within the past six months. With regard to the Yellow Jacket company, the case pending before the United States Supreme Court and its probable return to the lower courts for revision and re-trial, together with the almost impassable condition of the roads leading from the mine, rendering a dividend doubtful this month, and the rumored impoverishment of certain portions of the claim, are causes in themselves sufficient to create a slight panic. Added to these, a strong bear movement in other stocks was inaugurated early in the week, giving great impetus to a general decline. Yesterday a decided rally took place, and a still further advancement may be looked for.

Hale & Norcross—continues out of the market. At the close, $2,600 per foot is asked. This company's mine remains in a favorable condition. They have commenced operations on the new shaft.

Savage—with the balance of the list, has declined very materially during the past week, selling at $2,000@2,010, dropping to $1,870 and $1,700, seller, 30, and closing at $1,800. The ore extracted from this company's mine during the week ending January 19, amounted to 1,745 tons, showing an assay value of $61,812; previous week, 1,016 tons, valued at $35,923.

Crown Point—also sympathized with the general decline, opening at $1,290, then selling at $1,280@1,290, falling to $1,100@$1,090, and closing yesterday at $1,040. During the week ending January 18, 871 tons of ore were extracted: previous week, 980.

Yellow Jacket—exhibits the greatest decline on the list, a large number of shares changing hands, selling early in the week at $1,235@1,240, rapidly declining to $990, then to $850 and $720—a recession of $520 in four days—and closing at $760. From a report embracing the two first weeks of the present month, we learn that 2 780¾ tons of ore were extracted from the mine, and that during the same period the bullion yield had been $41,518. It is thought that the bullion product of the past week will amount to $60,000.

Gould & Curry—has been more active than for some time past, receding from $575 to $510, rallying to $570, then falling to $500, and at the close selling at $550.

Ophir—improved from $158 to $162 50, seller, 30 receded to $140, rallied to $150, and closed yesterday at $157 50.

Correspondence.

[FROM THE AMERICAN JOURNAL OF MINING—NEW YORK.]

Prof. Wurtz' Working Experiments with Sodium Amalgam—Big Results from Colorado Sulphurets, Etc.

Editor Journal of Mining: Among the many important reports now reaching us, the following is particularly interesting, as relating to what is without a doubt the most successful and satisfactory working of *auriferous sulphurets* ever yet accomplished. Mr. Bruce, the writer, is one of the most skilful and experienced amalgamators in Colorado, and is well known as a man of high conscientiousness. The deliberate testimony of such a man is beyond price. Mr. Bruce has just returned to Colorado, after a few week's absence, to continue his successful operations. His address is Black Hawk, Colorado. I wish here to announce that we have now to spare a number of packages of magnetic amalgam for experimental purposes.

HENRY WURTZ, No. 57 Broadway.

New York, February 21, 1867.

NEW YORK CITY, Feb. 14, 1867.

PROF. WURTZ—My dear Sir: At your request I cheerfully give brief statements of some of the results of my workings with sodium during the past season at my mill in Colorado. I have amalgamated in a twelve stamp mill, two batteries of six stamps each, with copper tables, and sluices below with blankets to catch the sulphurets; also part of the time in an eight stamp mill. Some few of my results have been already reported in letters, and also in statements in the *Black Hawk Mining Journal.* I certify that those statements were true, as well as those published at the same time about the results of Mr. Emory in the Narraganset Mill,* obtained with your sodium amalgam, furnished him by me for trial. I generally charged my quick at the rate of one ounce of your No. 2 Magnetic Amalgam to one pound of quick. I tried more, but then the gold collected on the stamp heads in the battery instead of the copper plates, which was inconvenient. The increase of yield was as great, but the amalgamation quicker. I tried again to amalgamate without sodium, but caught so little gold on the copper tables that after a few days I used sodium again, and have used it for months since, and shall always use it when I can get it. Having heard that statements have been circulated in New York that I reported against the use of sodium, I wish to say that these statements are without foundation, but the precise contrary is true. It has been said also that your amalgam injures the copper, but I have not found it so. I made exact experiments in a Bertola pan on concentrated sulphurets from my blankets, which gave with ordinary quick a bad result, and very little of anything. I showed you the retorted amalgam thus obtained from twenty pounds of ore. This was ground dry in the pan very fine for about four hours, then wet up with water and about seven pounds new quick, with about two ounces No. 2 Magnetic Amalgam put in and worked for two hours; but much less time for amalgamation with sodium would do, I think. On cleaning up there was no loss of quick. The bullion which I showed you has since been assayed at the mint. It weighed one ounce and a half with a fineness of $17.15 gold, and twenty cents silver per ounce, being equivalent to a yield from concentrated sulphurets of $2,602 50 per ton of two thousand pounds. Others to whom I have given samples of sodium amalgam have reported favorably; among them I shall mention Mr. Charles Aldridge, at the McIntyre Mill, Spring Gulch. I think it well, from what I hear, to say that I have no interest in sodium amalgam, either as a stockholder, agent, or otherwise; but my use of sodium has been from a desire to get at the truth and thus benefit myself. I want to add, that to my own personal knowledge, when they were experimenting with your amalgam at the mill of the Black Hawk Company, they were mining in "cap rock" (very lean ore) and they could not get more gold out than the ore contained. Precisely the same was the case at the Briggs Mill †

Very truly yours, JOHN C. BRUCE.

* These reports, Mr. Editor, have already appeared in your columns. That relating to the Narraganset Mill was to the effect that the yield of the ore in an experiment made on a large scale, in a battery of twenty stamps, was increased thirty per cent! I wish to suggest here, that in most cases such an increase as here stated, would be equivalent to an actual *doubling* of the net profits of the operation. H. W.

† Reference to recent statements in your mining summary will confirm this statement of Mr. Bruce. H. W.

—A process has been discovered by which India rubber can be bleached to a pure white, and after having been hardened will be used for collars and cuffs. It is a difficult one, which has been long sought for, and is done by a chemical process, which is said to be fatal to the workmen engaged therein, unless protection is afforded them.

PATENT CLAIMS.

Pertaining to Gas, Mining, Petroleum, Water etc.

FOR THE TWO WEEKS ENDING MARCH 2, 1867.

61,918—APPARATUS FOR CARBURETING GAS.—W. W. Bierce, Cleveland, Ohio:

1st. I claim the float D, perforated tin, F, and covering F', as arranged, in combination with the sleeve, G, tube, B, and slot, C, for the purpose and in the manner substantially as described.

2d. The shield, K, pipe, B, and sleeve, G, in combination with the case A, for the purpose and in the manner set forth.

61,992—COAL STOVE.—Albert Brown, Troy, N. Y:

I claim in combination with a fire box, and combustion chamber of stoves, a fuel magazine, or reservoir, A, as provided with lateral vents or apertures, a a a, substantially in the manner as herein described and set forth.

61,945—COOKING STOVE.—James Marshall, New Orleans, La.:

I claim the combination of the columns, b, and ledges, a, with the oven, A, hollow grate bars, the oven, B, and openings, C when covered by a cast cross bar, D, when these several parts are constructed and relatively arranged with respect to each other, as described for the purpose set forth.

62,083—STEAM GAGE.—Wm. Stamp, Susquehanna Depot, Pa.:

1st, I claim a concave flat bottomed or saucer-shaped steel plate diaphragm, fitted in a steam gage, and constructed as described.

2d. I claim also the eccentric abjusting pin, i, or its eqnivalent, in combination with the pendant lever, h, and the segment, d, constructed and operating substantially as herein described.

62,115—COMPOSITION FOR ROOFING.—John P. Cowing, Seneca Falls, N Y.:

I claim the simple compound of ground fire clay, rock and coal tar as specified.

62,118—EXTINGUISHING FIRES.—R. Ogden Doremus, N. Y. City: Ante-dated Feb. 6, 1867.

I claim the within described method of extinguishing fire by means of sulphurous acid, and ammonia or carbonic acid in a liquid or solid state, substantially as set forth.

62,225—LIGHTING GAS BY ELECTRICITY.—Samuel Gardiner, Jr., New York City:

1st. I claim the arrangement upon a bar a series of keys so placed in reference to the burners, as to be consecutively brought into electric connection therewith by a single impulse, substantially as described.

2d. I claim a sliding bar with an insulating support, and furnished with keys adapted to a series of gas burners, for the purpose described.

62,148—APPARATUS FOR HEATING AND COOKING BY STEAM.—Francis Milliken, Boston, Mass:

I claim the boiler and oven so constructed and connected that the hot air and products of combustion from the fire under the boiler, after being used to heat the oven, shall be returned, through the flues of the boiler, substantially as and for the purpose described.

I also claim the pipe, g, for conducting the heat from the steam to the inside of the article to be cooked, substantially as described.

I also claim the hollow sleeve or spit, h, substantially as and for the purpose described.

62,162—STEAM GENERATOR.—J. W. Summers, Sandy Hill, N. Y.:

1st. I claim the generator, H, when constructed as and for the purpose herein described.

2d. The air chamber, D, for the purpose of governing and controlling the pressure of steam in the generator, as and for the purpose described.

3d. The valve, I, for the purpose of dispersing the water, in the manner and for the purpose described.

4th. The combination of the valve, L K and O, the air chamber, D, and generator, H, the whole constructed, arranged and operating as and for the purpose described.

61,247—PUMP.—John Bean, Hudson, Michigan:

1st. I claim the box, C, constructed as described, provided with the pipes, E and D, substantially as and for the purpose specified.

2d. The box, C, with its pipes, when used in combination with the valve plates, E and d, substantially as and for the purpose specified.

62,265—PROPELLER.—Jacob Covert, New York City:

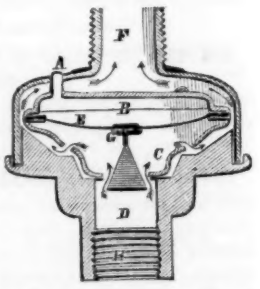
I claim a series of vertical floats, or blades, b, b, secured to parallel sides, E, and so arranged as to form a series of water compartments in combination with the crank, c c, substantially as described.

—Platinized copper vessels are being introduced into Europe, for purposes where heretofore those made entirely of platinum, have been employed. The former are said to be fully as safe and reliable for containing strong acids as the latter, and are of course very much cheaper.

NOTICE

To Gas Companies and Gas Consumers.

THOMPSON'S GAS CONTROLLER.



The only perfect SELF-ACTING REGULATOR and burner combined ever invented or known to science.

This Automatic Gas Controller works upon a simple and well-known principle n Mechanics. The lower cut fully shows its construction. The conical valve at G is attached to the elastic diaphragm, E. As the gas enters in the direction as shown by the arrows, the diaphragm E is acted upon according to the pressure of the gas, and tends to close the valve upon its seat. The chamber, B, of the inner case communicates with the air by the orifice, F (A). Hence the gas below the diaphragm is only balanced by the air above it and the valve falls or rises as the pressure varies, to regulate the admission of the gas, and consequently the pressure at the burner.

This Controller will save from 25 to 60 per cent. of gas according to the pressure in the mains, and gives a beautiful, steady light, at a minimum of cost.

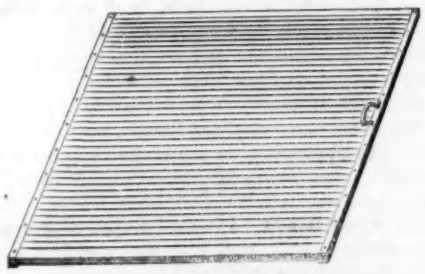
Late improvements have made this Controller simple, durable, and an unrivalled gas economizer.

Reference is permitted to the following gentlemen :—

Col. CHAS. ROOME,	Pres't Manhattan Gas Co,	N. Y.
C. H. SAND, Esq,	" Metropolitan Gas Co.,	"
J. H. ADAM, Esq.,	" New York Gas Co.,	"
PETER COOPER, Esq,	Cooper Institute,	"
JOHN A. DUFF, Esq.,	Olympic Theater,	"
GEO. H. KITCHEN,	Inspector of Gas Meters,	"
A. L. BOGART, Esq.,	Gas Engineer,	"
Col. J. A. SABBATON,	Engineer Man. Gas Co.,	"
Col. A. J. WHITE,	" Met. Gas Co.,	"
J. K. SIMPSON,	" Cooper Institute.	"

Persons interested are invited to call at the office, 22 Pine-str't, where they can see the operation by pressure guage and test meters.

M. L. CALLENDER, Agent.
22 Pine Street.



JOHN L. CHEESMAN,

MANUFACTURER OF PATENT CONICALLY SLOTTED SOLID WOOD TRAYS.

Two hundred per cent. cheaper than Iron and will last twice as long.

☞ All persons are cautioned against purchasing of any other person. Orders received by mail, or otherwise.

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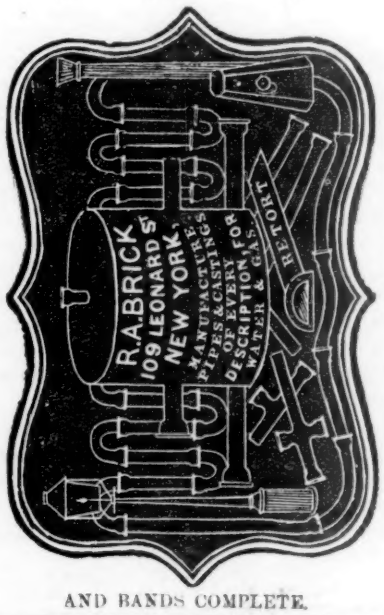

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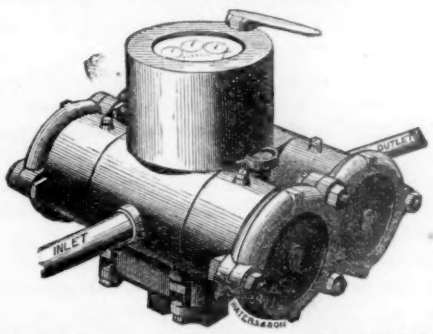

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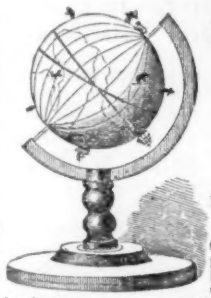

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SATURDAY, MARCH 2, 1867.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

SUBSCRIBERS would confer a favor upon us by remitting CHECKS or POST OFFICE MONEY ORDERS, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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Answers to Correspondents.

N. P. OF CAL.—Several chemical processes besides combustion will produce heat. The caloric evolved by pouring water upon lime is familiar to almost every one. The water combiues chemically with the ime, changing from a liquid to a solid state, whereby the latent heat becomes sensible. Wood may be inflamed by this operation; and a French invention utilizes the heat thus developed, for the purpose of cooking.

"OIL," N, J.—To bleach olive oil, expose it in bottles, to the action of the solar rays.

A. W. J., N. Y.—Asbeston is a mineral fibre. It has been employed for lamp wicks owing to its being incombusbible. J. F. Luhme & Co., importers of chemicals, 9 Lafayette Place, can supply you.

P. P., Ohio.—In the perfect combustion of coal, one atom of carbons combines with two atoms of oxygen, to form carbonic acid, $C O_2$. The atomic weight of carbon is 6. and of the oxygen 8. so the proportion is 6 pounds of carbon to 16 of oxygen.

N. B., Ill.—100 cubic inches of air will weigh 31 grains, and the proportion of oxygen is 22 76-100ths per cent. The amount of carbonic acid gas in the atmosphere is uniform in the lowest valleys, and upon the highest mountains. So our *savans* tell us. This is owing to the quality which all gases have of diffusion, irrespective to gravity.

"FUEL." MASS.—Bailliere Bros., 520 Broadway, have published a work on Peat, by J. Burrows Hyde, C. E.

The Gas Question.

We have the report of the evidence and other matter presented before the joint committee of the City Council of Boston upon the subject of Gas, as phonographically reported by Mr. J. M. W. Yerrington, and published by the Boston Gas-Light Co., It makes a bulky volume of between four and five hundred pages octavo, and we have been very much instructed and somewhat amused by a hasty perusal of its contents. The work of itself is creditable to its publishers, inasmuch as it gives to the public a plain and truthful statement of the proceedings as above stated. As expressed in the preface it owes its origin to an effort made by the joint committee of the Alderman and Common Council of the City of Boston, to have the laws altered in regard to the inspection of gas and gas-meters, and to consider the "expediency" of manufacture of gas by the city, and its supply to the citizens at a minimum of cost, and "*the expediency* of removing the gas factories outside the city limits."

The Boston Gas-Light Company deserve much commendation for the impartial manner in which they have placed the whole matter in a form so convenient and accessible to the public.

The testimony of some of the best gas engineers and scientific men of the country are here given, including that of Prof. W. B. Rogers, Dr. A. A. Hayes, and Messrs. John H. Blake, Esq, Gardner Warren, Esq., and W. W. Greenough, Esq., Mass., also Col. Chas. Roome, Engineer and Pres. of the Manhattan Gas Co., New-York City, and Jesse W. Starr, Esq., of New Jersey.

The testimony elicited will go to show the fallacy and folly of city or local governments entering the arena as manufacturers to compete with private individuals or companies, especially when, as in this country, politics grasps at any new element as a means to gain an advantage, and to extend and centralize political power, so frequently liable to operate to the detriment of the rights and interests of the public, which it should only conserve and protect. It might as well extend the principle and go into the manufacture of bread and clothing, or any other commodity or necessary of life.

It would seem that such a course will have a tendency to destroy competition, which is the soul of progress and improvement in any art or manufacture, and tends to lessens the cost to the public consumers, in proportion as it is open or closed to private enterprise.

It is impossible for a city to manufacture gas for the citizens either cheaper or better than private individuals or companies; all experiments of that kind have failed, and the universal experience shows that government cannot work as cheaply or as advantageously as private persons.

In this connexion also, we cannot fail to express our disapproval of the ill effects likely to ensue from efforts being made from time to time to hamper, restrict and control by leglislation the operations, management and even the profits which gas companies may realize under the charters previously granted them. Relying upon their charters in good faith, they go on and invest capital to erect works, and employ experienced engineers and scientific men, who by study and travel, and costly experiments, develop and improve the art of manufacture, not only for private but public advantage, only in time to be threatened by extra-legislative curtailment and restrictions. We shall as reasonably expect to hear of bills being presented to the State Legislature for the control and regulation of our iron manufacturing companies to restrict the profits of the shareholders to a certain percentage—and as a late gas bill before legislature provides—divide any surplus profits among the consumers. Why not insist upon a bill to fix the profits upon the amount of capital stock "actually invested" of of Clafflin Mellen & Co., or A. T. Stewart & Co. to "ten per cent." per annum and the "receipts over and above such dividends and the current expenses" to be "divided *pro rata*, among consumers paying $20 and upwards" for dry goods during the year? The same rule wonld be applicable to hotels, restaurants, to ferry and railroad companies, etc., and one could, by investing $20 in oyster suppers, or a like amount in a little pleasant metropolitan traveling! become virtually stockholder in these enterprises, *nolens volens*. Then too, every one, including involuntary stockholders, could see an "annual statement" of capital, property, or assets, "compensation paid to officers and employees" "specifications of dividends and any other claim and demand" against said companies, to cheer them for their daily assesments.

In our next issue we hope to find room to examine the HERALD'S great scheme in detail, for making gas 300 miles away, to supply the seaboard cities and the rest of creation.

Ventilation.

There is nothing more important to health and animal life than a proper ventilation of all kinds of houses and buildings, whether occupied by human beings or other animals, and there is no subject so much neglected by the public as this one of ventilation. It has been most impressively brought before the people by our most eminent writers, lecturers, and philanthropists, but in vain. Architects who construct magnificent public buildings and private palaces, think it quite sufficient to ventilate the halls and large saloons, and how few of our public halls afford ventilation enough to produce a pure atmosphere within, even with the co-operation of open doors and windows. Until the adoption of heaters in buildings, there was ventilation to some extent by the fire-places, but now almost every fire-place in winter has paper pasted over it in every room, to prevent the escape of the heated air thrown into the room from the register. Where gas is burned the deleterious influences of carbonic acid gas and carbonic oxide is added, and sometimes the windows are lifted to prevent the ingress of the outside atmosphere. If in such buildings where there is comparatively only a temporary crowd of persons, and those awake, the effect is not so bad as in the congregations of filthy and diseased persons who crowd all night the apartments they occupy, be they large or small. The horrible accounts given us of even respectable tenement houses, excite our wonder that violent diseases do not continually exist and fester among such a community. Public halls and dwelling houses are not alone in the necessity of ventilation. Stables—meat packing houses—large rooms where meat, poultry, game and *fish* are stored among ice—ordinary refrigerators in which family meats, butter, cream, milk and delicate fruit are placed for preservation, soon create gases noxious and unhealthy, operating upon each other and destroying the natural flavor of each if left for a length of time together. Of course from meal to meal this influence is not perceptible, but try it for a week adding fresh ice and drawing off the waste water, you will find substances unfit for any good use. Compare a pan of milk which has set twenty-four hours in a natural spring house, with another pan of milk which was in a refrigerator with the ordinary accompaniments, the same length of time at an equal temperature, and it will tell the tale.

Ordinary barns and stables above ground are usually ventilated by cracks and crevices, but when especial rooms are finished close for a pet horse or cow, without ample ventilation, the health of the animal will soon be affected, and lassitude and loss of appetite ensues. Where stables have been placed underground without sufficient ventilation, even blindness has ensued.

The offensive and very noxious gases from water closets are well known and under certain conditions of the atmosphere, will not pass out from an ordinary ventilator, *because the draft is downward*. This is a novel proposition to most persons, and appears inconsistent with the laws of nature, but the fact has been known as far back as the time of Franklin. It has been deemed sufficient by many house builders—and we are sorry to say, some who style themselves architects,—to simply place a tube from

under the seats of a water closet, or at the head of every stall where the animal breathes—whether under or above ground—and have that tube pass sufficiently high to be above surrounding buildings and the ventilation is complete! Now, when the atmosphere is in a proper condition of temperature, these ventilators act to some extent and are better than none at all—but take a strong case—enter an underground stable on a cold morning, in what condition do you find the atmosphere, and in what spirits are your horses? The atmosphere will be warm, with an offensive and oppressive odor, and the horses dull and inactive.

Knowing that there is at times a *downward current* to insure a constant and regular ventilation, various artificial means have been heretofore invented to produce it, but without entire success. The principle that heat will produce an upward current is established by every day's experience, and we are prepared to assert, that if a sufficient degree of continuous heat should be created in the tubes from the water closet and those at the heads of the stalls in the stable, that a positive and continuous ventilation would be had and both places be free from foul air and unpleasant odor.

A system of ventilation upon this plan has been lately invented by Mr. HENRY A. GOUGE, No. 254 Broadway, New-York, and he has written a most interesting and valuable pamphlet of 48 pages, explanatory of his system in a clear and graphic style, which he will send free on application. He has put up his apparatns at the Fifth Avenue Hotel, St. Nicholas, St. James, Brevoort, and many other first class hotels, and also in some pork packing houses, meat rooms and stables, in all cases giving entire satisfaction, as his numerous certificates show.

We do hope this subject will not be any longer neglected, indeed, it would be a proper subject for legislation.

New Pedestrian Bridge.

The Pedestrian Bridge at the corner of Fulton st. and Broadway is being rapidly pushed forward to completion. The foundation for the iron columns are sunk ten feet deep, in each of the four corners of Broadway and Fulton street. They rest on a base of granite mason work six feet square, and are 15 inches in diameter at their largest part, and about 30 feet in height, measuring from their base to the top of the ornamental lamp-post, which is to surmount them. The footways will be supported by ornamental truss girders. There will be three flights of steps and two landings, on reaching which the pedestrians may cross Broadway or Fulton street, at pleasure. The bridge has previously been fitted together, and found capable of sustaining a pressure of 100 tons, which is 90 tons more than it is likely to be subjected to at any time.

The whole structure will be of iron, strongly braced and stayed, and will have an appearance of extreme lightness and elegance, combined with great strength. Rich & Griffiths, Architects, 153 Broadway, are the designers and contractors. The contract price was $15,000, but the builders state the actual cost at $22,000.

ON WATER SUPPLY.—On the fifth page will be found the commencement of a long but most interesting article on the Water Supply of London. The author, it will be seen, proposes to tap a source of 240 miles from London, by a plan which it is estimated, will cost *sixty-one millions of dollars!* The matter of water supply is one in which the city of Philadelphia will soon be compelled to act, in a comprehensive scale, for in Philadelphia the present plan of supply cannot much longer be made to satisfy the wants of the increasing population.

Fortunately there are rivers of fresh water diverging from Philadelphia, so that to hydraulic engineering belongs the task of determining, on a scale adequate for future supply, where water can be most eligibly obtained, and how it can be most judiciously conveyed, from an abundant source to an absorbing destination.

The falls at New Hope would furnish *power* to force water to high grounds in that vicinity, whence it might be conveyed to the city at a cost not exceeding the proposed Perkiomen plan of supply.

☞ NEW EXCHANGE.—We have received for exchange the first number of the 4th Vol. of the *Journal of Materia Medica*, conducted by Joseph Bates, M. D., and H. A. Tilden, New Lebanon, N. Y. It is a well gotton up journal of 32 pages, devoted to Materia Medica, Pharmacy and Chemistry. Druggists, Physicians and Chemists will find this a valuable paper.

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January 1st 1867. J. H. TIEMANN.

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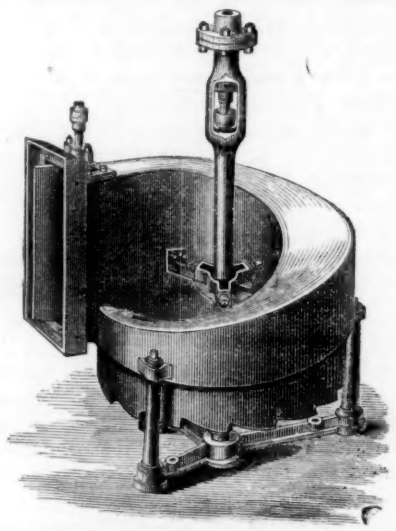

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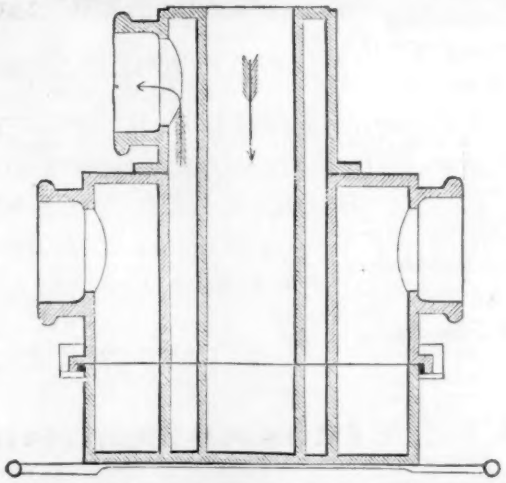

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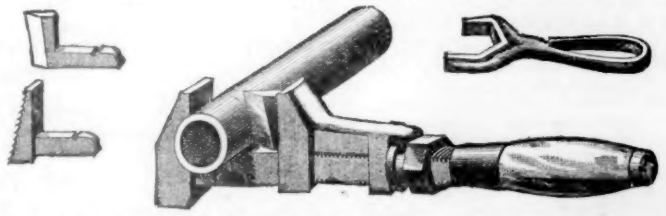

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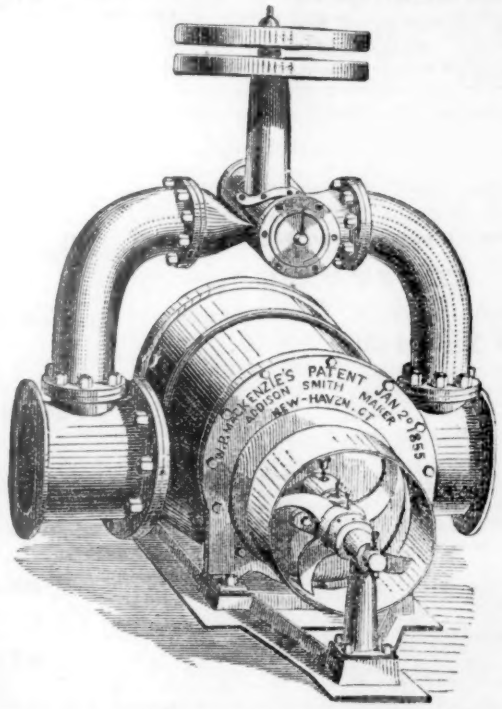

They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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CERTIFICATE.

Office Louisville Gas Co., Louisville, June 28, 1865.

This is to certify, that the Louisville Gas Co. have used for about two years, the Glycerine prepared by Messrs. Hartman & Laist of Cincinnati, in their Wet Meters, and have in all instances found it to give most perfect satisfaction. Prior to the use of the above Glycerin, we had employed that manufactured by other parties, and we consider H. & L.'s superior to any we used.

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A PERFECT SUCCESS. BY THIS INVENTION the long sought-for object has been accomplished; to wit: A means by which steam can be generated safely, so that there shall be no more danger from explosion than with the hot-air engine, and at the same time retain all the power of the steam engine. This much sought for result has at last been accomplished, and after many severe tests we feel fully warranted in offering this Steam Generator and Engine to the public as a perfectly safe power, and at the same time a cheap power. As a generator of steam for heating buildings, etc, there is not its equal in use. For further information or circular, address

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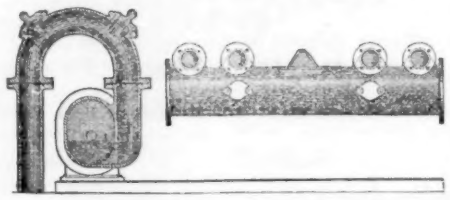

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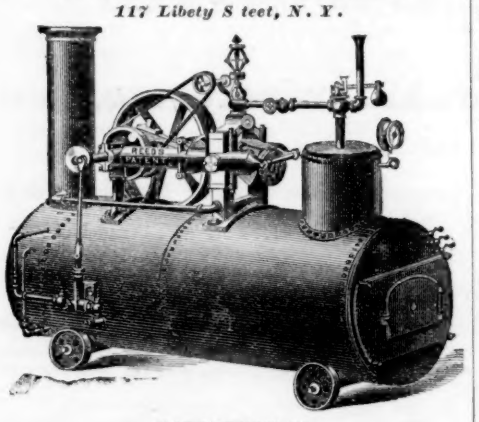

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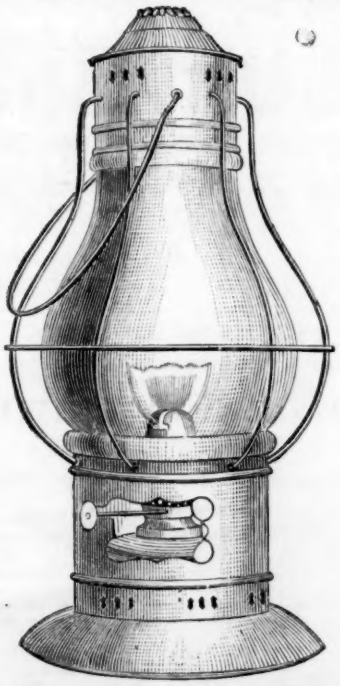

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We are manufacturing at our factory, Middletown, Conn., MANY OTHER STYLES AND SIZES, which can be seen at our Show Rooms, 81 Fulton-st., New York. TRIMMINGS etc., always on hand.

☞ The Trade are invited to call and examine our Stock.

EDDY'S

Kerosene Cooking & Heating

STOVES AND RANGES.

THESE COOKING STOVES WILL

☞ *Bake, Boil, Stew, Fry and Roast,*

With the greatest economy and facility, and without heating the room in which they are used. They are perfectly simple, operating like an ordinary Kerosene Lamp with a chimney, and are the only Kerosene Stoves that burn without smoke or odor.

"We have been perfectly astonished to see what a labor-saving, dirt saving and heat-saving institution is EDDY'S PATENT KEROSENE STOVE. Taking the cost of running it, and the result attained, it is the best patent in the market."—*Worcester Daily Spy.*

Our Heating and Cooking Stoves are very convenient and economical, especially where a fire is required but a few hours at a time.

Orders for Stoves may be sent through American Advertising Agency, 389 Broadway, New York.

ALEX. M LESLEY,
Manufacturers, No. 605 Sixth Ave., New York.
Send for Illustrated Circular. (136

KNITTING MACHINES

FOR

Families and Manufacturer,

☞ *Something New and Invaluable for Family Use.*

We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

It will knit a variety of Stitches—the breakage of needles is trifling—the cost of needles is insignificant and the most delicate material can be knit pure and spotless, as the needles are not oiled.

Orders for Machines may be sent through the American Advertising Agency,
389 Broadway, N. Y.

Send for a Circular—Agents wanted.

DALTON KNITTING MACHINE CO.,
137] 537 Broadway, N. Y.

WEED'S

HIGHEST PREMIUM

Shuttle Sewing Machine

Has only to be seen and operated to be Appreciated.

Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usually found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

3d. No imperfect action of the feed at uneven places in the work.

4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 200 cotton to coarse linen thread.

5th. The Weed Machine will do beautiful quilting on the bare wadding, without using inner lining; thus leaving it soft as if done by hand.

6th. The variety of fancy work that can be done on the

WEED MACHINE,

with so little trouble, makes it equal, if not superior, to six machines combined; for instance, it Binds, Hems, Tucks and Sews on the band at the same time, and in face, the

WEED NO. 2 MACHINE,

as before stated, is equivalent to a combination of any six ordinary machines.

Orders for Machines may be sent through the American Advertising Agency, 389 Broadway, N. Y.

Below we give a few prices:

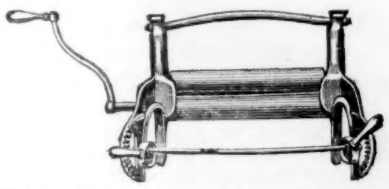
No. 2. Oil Black Walnut, Ornamented with Hemmer.	$60,00
No. 2. Oil Black Walnut, Hall Case, Ornamented, with Hemmer.	65,00
No. 3. Extra Oil Polished Black Walnut, Half Case, Large Table beautifully Ornamented.	75,00

WEED SEWING MACAINE Co.,
136, 506 Broadway, New York

PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog-wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $3 to $10 per day

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*
That a *simple* machine is better than a complicated one.
That a Wringer should be *self-adjusting, durable, and effic ient.*
That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.
That wood soaked in water will *swell, shrink,* and *split.*
That wood-bearings for the shaft to run in *will wear out.*
That the Putnam Wringer, with or without cog wheels, will *no tear the clothes.*
That cog-wheel regulators are not essential.
That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.
That all who have tried it pronounce it the *best* Wringer ever made.
That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and any others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydize or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

JOHN W. WHEELER, Cleveland, O.

Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 100 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, $9, and $10.
Sample Wringers sent, express paid, on receipt of price.
Manufactured and sold, wholesale and retail, by

PUTNAM MANUF'G CO.,
13 PLATT STREET, New York,
BENNINGTON, Vt.,
CLEVELAND O.

C. GEFRORER,

MANUFACTURER OF

Gas Heating Apparatus

OF EVERY DESCRIPTION,

Gas Burners, &c.

No. 529 COMMERCE STREET,

PHILADELPHIA, PA.

Burners for Wood Coal Oil nd Water Gas

Gas and Lava Burner Tips

Constantly on Hand 65

THE AMERICAN METER CO.

Organized under the General Manufacturing Laws of the State of New York

SAMUEL DOWN, President. HENRY CARTWRIGHT, Vice President. RICHARD MERRIFIELD, Secretary and Treasurer

Trustees.

SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.

THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. No. 23 West Street, Boston will meet with prompt attention.

Harris & Brother, Practical Gas Meter Manufacturers,

Continue, as heretofore at their old Establishment, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture

WET AND DRY GAS METERS, and all kinds of GAS APPARATUS, and furnish all articles appertaining to the use of Gas Works. ☞OUR WORK WARRANTED—Satisfaction Guaranteed. Orders respectfully solicted, and promptly attended to, by

HARRIS & BRO., No 1117 Cherry st., Philadelphia.

Messrs. Harris & Brother, Philadelphia Gas Works, February 14, 1857.

Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality—the number furnished by you to these works is over 5,000. John C. Cresson, Engineer;

Office of the Gas Light Company of Augusta, Ga., March 6th, 1858.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of wokmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.

G. S. Hookey, Superintendent of the Gas Light Company of Augusta, Georgia.

Messrs. Harris & Brother, Philadelphia. Philadelphia, March 4, 1858.

Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are, gentlemen, very truly, yours, Birkinbine & Mears.

Messrs. Harris & Brother. March 14, 1857.

Gentlemen—For the last ten years we have used in the Philadelphia Gas Works, meters made in your factory, and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the material used in the manufacture of the same, to be as fine quality as is used in those imported from Europe, or made by any of the manufactur in the United States. Respectfully Yours George Wiegand, Inspector of Gas Fittings, Philadelphia

C. GEFRORER,

MANUFACTURER OF GAS BURNERS,

529 Commerce Street, Philadelphia, Pa.

Burners for Wood, Coal Oil, and Water Gas. Brass and Lava Burner Tips Constantly on Hand.

GROVESTEIN & CO.,

PIANO FORTE MANUFACTURERS,

499 BROADWAY, NEW YORK.

THE ATTENTION of the public and the trade is invited to our New Scale, Seven Octave, Rosewood Piano Fortes, which for volume and purity of tone are unrivalled by any that have hitherto offered in this market. They contain all the modern improvements, French Grand Action, Harp Pedal, Iron Frame, Over-strung Bass, etc., and each instrument, being made under the supervision of Mr. J. H. Grovesteen, who has had a practical experience of over thirty years in their manufacture, is fully warranted in every particular.

THE "GROVE-TEEN PIANO-FORTE"
RECEIVED THE HIGHEST PREMIUM AT THE
CELEBRATED WORLD'S FAIR.

Where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

By the introduction of improvement we make a still more perfect Piano-Forte, and by manufacturing largely, with a strictly cash system, are enabled to offer these instruments at a price which will preclude all competition.

PRICES!

No. 1,	Seven Octave, round corners, Rosewood, Plain Case,	$275
No. 2,	" " " Heavy Moulding	300
No. 3,	" " " Louis XIV style	325

a fac-simile of the accompanying cut.

TERMS—Net Cash, in current funds Descriptive circular sent free on application.

MORRIS, TASKER & CO.,

PASCAL IRON WORKS

[ESTABLISHED 1821,]

PHILADELPHIA,

Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues, GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

Gas and Steam Fitters' Tools, &c.

STEPHEN MORRIS,
THOMAS S. TASKER,
CHAS. WHEELER,
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SOUTHWARK FOUNDRY,

FIFTH & WASHINGTON STREETS,

PHILADELPHIA.

MERRICK & SONS, Engineers,

MANUFACTURERS OF EVERY DESCRIPTION OF GAS MACHINERY.

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gas holders, either Telescopic or Single, with Suspension Frames complete; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam of Hand Air Pumps for providing Street Mains, Centre Seals, Governors, Wrought or Cast-Iron, Line Sieves for Purifiers, Purifier Hoisting Machines, &c., &c.

Address— MERRICK & SONS,
5th and Washington Sts, Philadelphia.

S. FULTON & CO.,

(Successors to Colwell & Co.)

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heavy & Light Castings of every description, No. 207 North Water street and 206 North Wharves. Philadelphia.

SAMUEL FULTON, THEO. TREWENDT

TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works
417 Walnut st., Philadelphia.

POOLE & HUNT,
BALTIMORE, MD.,
are prepared to execute orders for
GAS-HOLDERS,
IRON-ROOF FRAMING,
And other descriptions of
Iron Work for Gas-Works, Water-Pipes, and Heavy Castings, and Machinery generally.

GEO. H. KITCHEN & CO.,

NEW PATENT

GAS APPARATUS

For Country Residences, Public Buildings, &c.,

FROM $300 UPWARDS.

EVERY DESCRIPTION OF GAS FIXTURES.

Gas Fitting in all its banches

561 Broadway,
NEW YORK.

THE WOODWARD
Steam Pump Manufacturing Company,

MNUFACTURERS OF THE WOODWARD P A E PROVED

SAFETY STEAM PUMP,

—Adapted for Mining and Fire Purposes—and **Steam, Water & Gas Fittings of All Kinds.**

Also, Wholesale and Retail Dealers in WROUGHT IRON PIPE, BOILER TUBES, etc.,

Woodward Building, 76 and 78 Centre Street,
corner of Worth street, *New York.*
Formerly 77 Beekman Street,
53 GEO. M. WOODWARD, Pres't. 64

JOSEPH LENNIG,

1615, 1617, and 1619 Francis St.,

Above Ridge Avenue, Philadelphia, Pa.,

MANUFACTURER OF

Wet and Dry Gas Meters,

STATION, SHOW, & EXPERIMENTAL METERS,

Photometers, Pressure Registers, Indicators, and Gauges, Governors, Meter Provers, Centre Seals, Fluid Gauges, &c.

GAS APPARATUS

Of the most reliable and approved construction manufactured and on hand at the UNION GAS METER WORKS.

D. PARRISH, Jr.,

GAS ENGINEER

And Contractor for Coal or Oil Gas-Works.

Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.

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Box 1956, Post Office.

To Manufacturers of Petroleum Gas.

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

SAVING OF FUEL TO PARTIES USING STEAM.
DAMPER REGULATORS.

Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture dan per regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 117 Broadway, New York.

THE AUBIN BALLANCED

VALVE WATER METER,

(Used also for Oils and Liquors)

Is now in use by many City Water Cos., because of its low price, simplicity, durability, accuracy under any pressure, and (a great advantage) because it runs with less head than any meter used. Manufactured by H. Q. HAWLEY, Albany, N. Y.

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.

J. D. WEST & CO.,
No. 40 Cortland street,

R. D. WOOD & CO.,

MANUFACTURERS OF

CAST-IRON PIPE, RETORTS, &c.

Office, 400 Chestnut Street,

PHILADELPHIA.

Great Improvement

IN

Sewing Machines.

EMPIRE

SHUTTLE MACHINE!

Patented February 14th, 1860.

Salsroom, 536 Broadway.

This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather to the finest Nansook Muslin, with cotton, linen, or silk thread, from the coarsest to the finest numbers.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

Emphatically a Noiseless Machine!

PRICE OF MACHINES,

COMPLETE:

No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
No. 2. Small Manufacturing, with Extension Table, $75
No. 3. Large Manufacturing, with Extension Table, $85
No 3. Large Manufacturing, for Leather, with Rolling Foot and Oil Cup, 100

One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given Terms, invariably CASH on delivery.

T. J. McARTHUR & CO.,
536 Broadway.

GAS-BURNERS.

WIGHTMAN BROS.,

IMPORTERS AND

SOLE AGENTS

For the United States and Canada, of

SCHWARZ'S

GERMAN LAVA GAS-TIPS

And proprietors of Winchester's Improved

LAVA TIP GAS BURNERS,

No. 25 Kilby Street,

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MANUFACTURER OF

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And Importer of SCOTCH TIPS,

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Mercury Cups, Portable Sockets, Burner Pillars, Burner Pliers, &c., &c.

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For Lighting and Heating Purposes.

GAS HEATING AND COOKING APPARATUS; FITTERS' ROVING APPARATUS, &c.

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Sole Agent for the sale of

Thompson's Gas Controller

In the States of

CALIFORNIA AND OREGON,

San Francisco, Cal.

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GENERAL

PURCHASING

AGENCY,

In Connection with all the Expresses

No. 30 Broadway,

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Established 1854.

Purchases to order any article wanted from New York, or Europe, for ladies' or gentlemen's use or wear,---comfort or luxury,--from a cameo to a cashmer, a seal ring to a steam engine.

Goods purchased at current City prices, and forwarded by Express or as directed.

Commission, Five Per Cent

Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

THE HAVANA

MEXICAN & BRAZILIAN

EXPRESS.

CARRINGTON & CO.

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Express for HAVANA and ISLAND OF CUBA by regular steamships weekly.

Express for MEXICO and VERA CRUZ on the 10th and 16th of every month.

Express for ST. THOMAS, BAHIA, and RIO DE JANEIRO each month.

Packages received for United States Brazil Squadron.

Freights should be sent to our office day before sailing of steamer, with invoice, contents and value.

FINKLE & LYON'S

New Family

SEWING MACHINE

Should be known in

IN EVERY TOWN.

To accomplish this at once and save the expense of a *Travelling Agent*, we offer thus, viz:

Any one sending us orders for two machines shall receive one machine free of charge. This proposition cannot avail after we have appointed a local agent in the town.

We have now completed our *new manufacture* at a cost of some $200,000—introducing *new patents*, and such important improvements, that without fear we are able to offer the following stringent guarantee, viz: After a fair trial, if any purchaser does not prefer the FINKLE & LYON FAMILY SEWING MACHINE to any other, he can return it and have back his money.

This machine has taken many of the HIGHEST PRIZES; *is less complicated than any other first class machine; does a wider range of work without changing; requires no taking apart to clean or oil, no "lessons" to set needle, regulate tension or operate machine.*

Our new Manufacturing Machine is sold on the same terms as the Family Machine.

Please send for a circular with samples of sewing.

Finkle & Lyon S. M. Co.

No. 581 BROADWAY, NEW YORK.

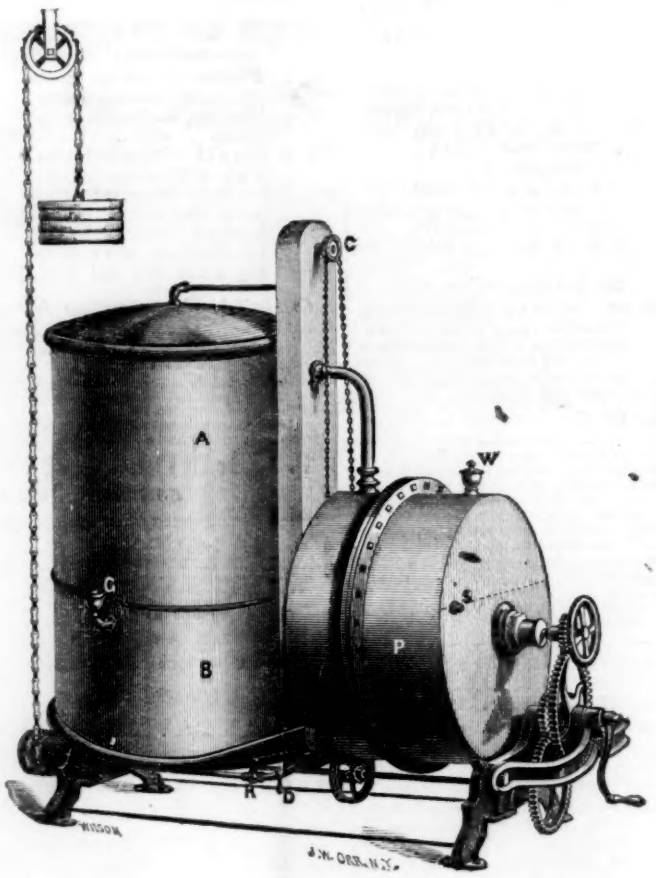
EMPIRE STATE GAS MACHINE,

LEVI STEVENS' PATENT, FOR SUPPLYING,

Dwellings. Stores, Factories and Public Buildings.

THE GAS GENERATED BY THIS MACHINE

Is a mixture of the vapor of hydro-carbon with common air. The mechanical devices employed are such as, from a long experience and critical examination into the nature of the element brought into use, seem best adapted to secure a certain and satisfactory result. GASOLINE, the liquid employed, is the more volatile portions of Petroleum, of a specific gravity of 0.6587. This liquid exposed to the action of this machine is vaporized, and a close mechanical mixture of the vapor with common air is effected. The value of the gas produced, its permanency, its illuminating quality, and freedom from liability to condensation, depend almost entirely upon the perfect and uniform character of this mixture. Hence the great importance of mechanical means adapted to secure all the conditions requisite in a Portable Gas Machine.



THE PRICE-LISTS OF MACHINES COMPLETE;

(Boxed and delivered on the cars at the Manufactory.)

No. 1,	$150,	5	Argand Burners.
do. 2,	250,	10	do.
do. 3,	350,	20	do.
do. 4,	450,	35	do.
do. 5,	600,	60	do.
do. 6,	1,000,	125	do.
do. 7,	1,500,	250	do.

This machine will produce the most brilliant and steady light without Fire or Heat, and is warranted to operate in every respect as represented.

The EMPIRE STATE GAS MACHINE is the most SIMPLE and EFFECTIVE MEANS KNOWN FOR PRODUCING GAS WITHOUT HEAT.

Its action is automatic, feeding itself with constant supplies of Gasoline, thus securing steady and uniform supplies of Gas. The gas produced is equal to the best known Illuminating Gas. It is as economical as any other, and is adapted to a wider range of use for Lighting, Heatin and Mechanical purposes. It will maintain its illuminating power under as great a degree of cold as any other. It is free from danger with the ordinary care in using gas. Its remarkably pure and steady light is pleasant for the eye. It renders it easy for persons living remote from street gas pipes to enjoy the luxury of a pure GAS-LIGHT, at a COMPARATIVELY SMALL COST, AND WITH LITTLE TROUBLE.

☞ The public are invited to witness its operations at our store. GASOLINE will be supplied by us, at market prices, or may be obtained from the various other sources of supply now going into operation.

MITCHELL, VANCE & Co., 620 Broadway, New York,

Manufacturers of Chandeliers and Gas Fixtures of every description. Also Chandeliers, Brackets, Lamps, &c., for Coal Oil, adapted to Churches, Public Buildings, Dwellings, &c.

MAR. 21 1867.